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Jennifer D. Ahearn

Jennifer Ahearn

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PATENT
Atty. Docket No. 35512-6

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

G. MICHAEL PHILLIPS, ET AL.

Serial No.: 09/392,106

Filed: September 8, 1999

For: Forecasting Using Interpolation Modeling

Group Art Unit: 3624

Examiner: A. Bashore

TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION - 37 C.F.R. § 1.192)

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith, in triplicate, is the Appeal Brief in the above-referenced patent application, with respect to the Notice of Appeal filed on July 2, 2003.

This Appeal Brief is being submitted on behalf of Assignee, c4cast.com, Inc., a corporation operating as a small entity.

Pursuant to 37 C.F.R. § 1.17(f) enclosed please find a check in the amount of $160.00 to cover the small-entity filing fee for the Appeal Brief. If any additional fees are due for the filing or the Appeal Brief, the Commissioner is authorized to charge them to Deposit Account No. 13-3735.

If there are any fees due in connection with the filing of this paper that have not been accounted for in this paper or the accompanying papers, please charge the fees to our Deposit Account No. 13-3735. If an extension of time under 37 C.F.R. 1.136 is required for the filing of this paper and is not accounted for in this paper or the accompanying papers, such an extension is requested and the fee (or any underpayment thereof) should also be charged to our Deposit Account. A duplicate copy of this page is enclosed for that purpose.

Respectfully submitted,

MITCHELL, SILBERBERG & KNUPP LLP

Dated: August 28, 2003

By _____
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Jennifer D. Ahearn

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PATENT
Atty. Docket No. 35512-6

#13

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

G. Michael Phillips, et al.

Serial No.: 09/392,106 — Group Art Unit: 3624

Filed: September 8, 1999 — Examiner: A. Bashore

For: FORECASTING USING INTERPOLATION MODELING

APPELLANTS' BRIEF
ON APPEAL TO THE BOARD OF PATENT APPEALS AND INTERFERENCES

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

Appellants in the above-captioned patent application appeal the final rejection of claims 1 to 26 set forth in the Office Action mailed April 8, 2003, a Notice of Appeal having been filed on July 2, 2003.

I. REAL PARTY IN INTEREST

The real party in interest in this application is c4cast.com, Inc., pursuant to an assignment recorded on September 8, 1999, at reel 010237, frame 0399.

II. RELATED APPEALS AND INTERFERENES

Appellants are not aware of any related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1 to 26 have been finally rejected and are the subject matter of this appeal. In accordance with 37 C.F.R. § 1.192(c)(9), a copy of the claims involved in this appeal is included in Appendix A attached hereto.

IV. STATUS OF THE AMENDMENTS

No amendment has been filed subsequent to the final rejection.

V. SUMMARY OF THE INVENTION

The present invention utilizes a unique forecasting model and unique data inputs to predict the value of a target variable (e.g., the market price for a share of Microsoft common stock). Generally speaking, the forecasting model of the present invention is based on a best fit of previously predicted values of "predictor variables" to historical values for the target variable. See, e.g., page 65 line 18 to page 66 line 1 of the Specification. Current predictions for the predictor variables are then input into the forecasting model to predict the target variable. See page 66, lines 2-7.

For example, if the target variable is the market price for a share of Microsoft common stock, the predictor variables might be the unemployment rate, the gross national product and the inflation rate. First, the above-mentioned forecasting model is generated (based on historical Microsoft share prices and previous predictions for the unemployment rate, the gross national product and the inflation rate). Then, current predictions of the values for at least some of such predictor variables are obtained and used in conjunction with the forecasting model to predict a value for the target variable.

In the preferred embodiments, the forecasting model has a generally standard form with variable parameters. According to one representative example, those parameters are assigned by using stepwise linear regression to obtain a best fit of predictions for the predictor variables made on the first of each month, from January of 2002 through August of 2003, to historical values of the share price for Microsoft common stock of the 25th of the same month. See, e.g., page 66 lines 7-11 of the Specification. Once the forecasting model parameters have been specified in this manner, the forecasting model can be used to predict the future values of the Microsoft common stock share price. For example, predictions for the predictor variables made on September 1, 2003, might be plugged into the derived forecasting model to obtain a prediction for the share price of Microsoft common stock on September 25, 2003. Alternatively, if it is determined that the predictions for some of the predictor variables have insufficient correlation to the historical values for the target variable, such predictor variables may be omitted when generating the prediction for the target variable.

The creation of a forecasting model based on a comparison of previous predictions for a group of predictor variables to historical values for a different target

variable and then the use of current predictions for at least some of the prediction variables in conjunction with the forecasting model to predict a value for the target variable has been found to provide better accuracy than can be achieved with many conventional forecasting techniques. In this regard, such conventional forecasting models, to the extent that they use other variables in connection with the prediction of a target variable, tend to use historical data values for such other variables. Such historical data values may be used in the generation of the forecasting model, the use of the forecasting model to predict a future values for the target variable, or both. On the other hand, the present invention's use of predictions for the predictor variables both in the generation of the forecasting model and in the use of such forecasting model to predict a future value for the target variable often can pick up and incorporate information that is not available when only historical values are utilized.

For example, predictions often incorporate consumer and/or investor expectations, as well as other types of intangible information that are not reflected to the same extent in historical data values. In addition, when the predictor-variable predictions are made by a large group of individuals, the result in predicted values often will incorporate attitudes of the population that might actually affect how aspects of the economy will change in the future, e.g., by creating a self-fulfilling prophecy.

Still further, because such predictions relate to variables that are different than the target variable, such predictions often will have fewer biases than direct predictions of the target variable. For instance, some portion of the population (e.g., shareholders) might have a vested interest in the movement of the share price for Microsoft common

stock. At the same time, most people generally would be free of any particular bias regarding inflation rates, gross national product or unemployment rates.

Lastly, the techniques of the present invention often can be used in situations where there is not a sufficiently large number of direct forecasts for the value of the target variable, or a sufficiently large number of reliable direct forecasts. In these cases the use of the present technique often can effectively increase the size of the forecasting pool, thereby leading to more accurate predictions. See, e.g., page 17 lines 1-7 of the Specification.

To some extent, the preceding discussion speculates as to the reasons for that the technique of the present invention provides good forecasting results. Other factors also may come into play. In any event, use of use of a technique according to the present invention often can result in better predictions for the value of a given target variable.

VI. ISSUES PRESENTED ON APPEAL

The issues are: (i) whether claims 1 to 4, 6 to 8, 10 to 18 and 20 to 26 are properly rejected under 35 U.S.C. § 103(a) over U.S. Patent 5,812,988 (Sandretto) in view of U.S. Patent 5,745,383 (Barber) and U.S. Patent 5,842,199 (Miller); (ii) whether claim 5 is properly rejected under § 103(a) over Sandretto in view of Barber, Miller and U.S. Patent 5,761,442 (Barr); and (iii) whether claims 9 and 19 are properly rejected under § 103(a) over Sandretto in view of Barber, Miller and allegedly admitted prior art.

VII. GROUPING OF THE CLAIMS

In the Office Action, the Examiner grouped the claims in a particular manner. However, upon reviewing the applied art and the grounds for rejection set forth by the Examiner, for purposes of the present appeal Appellants have determined that the claims are more appropriately grouped as follows:

GROUP 1: Claims 1, 3, 4, 6, 7, 10-12, 14 and 23

GROUP 2: Claim 2

GROUP 3: Claim 5

GROUP 4: Claim 8

GROUP 5: Claim 9

GROUP 6: Claim 13

GROUP 7: Claim 25

GROUP 8: Claim 15, 17, 20-22 and 24

GROUP 9: Claim 16

GROUP 10: Claim 18

GROUP 11: Claim 19

GROUP 12: Claim 26

As explained below, each of the above groups is believed to be separately patentable over the applied art. In particular, each identified group recites at least one additional non-obvious feature that provides an additional reason why each claim in such group is not rendered obvious by the applied art.

VIII. ARGUMENT

The requirements for establishing a prima facie case of a § 103 rejection have been stated as follows:

> a proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success. [citing *In re Dow Chemical Co.*, 837 F.2d 469, 473, 5 U.S.P.Q.2D 1529, 1531 (Fed. Cir. 1988).] Both the suggestion and the reasonable expectation of success must be found in the prior art, not in the applicant's disclosure.

In re Vaeck, 947 F.2d 488, 493 (Fed. Cir. 1991).

Citing this case, MPEP § 2142 requires that in order to establish a prima facie case of obviousness, the Examiner must cite prior art references that teach or suggest all of the claim limitations and, if more than one such reference is required to disclose all such limitations, there must be some suggestion or motivation, either in the prior art references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings.

With regard to the requirement that the prior art references teach or suggest all of the claim limitations, the Federal Circuit has held:

> Rarely, however, will the skill in the art component operate to supply missing knowledge or prior art to reach an obviousness judgment. See *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 .2d 1540, 1553, 220 U.S.P.Q. (BNA) 303, 312-13 (Fed.Cir.1983) ("To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher."). Skill in the art does not act as a bridge over gaps in substantive presentation of an obviousness case, but instead supplies the primary guarantee of objectivity in the process. See *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718, 21 U.S.P.Q.2D (BNA) 1053, 1057 (Fed.Cir.1991).

Al-Site Corp. v. VSI Int'l, Inc., 174 F.3d 1308, 1324 (Fed. Cir. 1999).

As to motivation to combine prior art teachings, the Federal Circuit has held as follows:

> This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." [citation omitted]

In re Lee, 277 F.3d 1338, 1343-44 (2002).

> In its decision on [the subject] patent application, the Board rejected the need for "any specific hint or suggestion in a particular reference" to support the combination of the [applied art] references. "Omission of a relevant factor required by precedent is both legal error and arbitrary agency action." [citation omitted]

Id. at 1344.

As discussed below, the above requirements for establishing a prima facie case of obviousness have not been met for any of the following groups of claims.

Group 1 Claims

Independent claims 1 and 23 address the problem of predicting the value of a target variable by using predictions of other variables. This is accomplished by obtaining: (i) historical values for the target variable at each of plural time points, (ii) previously predicted values for each of plural predictor variables, and (iii) currently predicted values for each of the plural predictor variables, with the plural predictor variables being different from the target variable. Values are then assigned to parameters of a forecasting model to obtain a best fit of the previously predicted values for the plural predictor variables to the historical values for the target variable. Finally, a predicted value for the target variable is generated from the currently predicted values for at least a subset of the plural predictor variables using the forecasting model and the values assigned to the parameters of the forecasting model.

The foregoing combination of features is not disclosed or suggested by the applied art. In particular, no permissible combination of Sandretto, Barber and Miller discloses or suggests at least the features of: (i) assigning values to parameters of a forecasting model to obtain a best fit of previously predicted values for plural predictor variables to historical values for a target variable; and then (ii) using the forecasting model and assigned values to generate a predicted value for the target variable from currently predicted values for at least a subset of the plural predictor variables, with the plural predictor variables being different from the target variable.

In this regard, Sandretto concerns a technique for determining the net present values and risks for a group of assets. Specifically, Sandretto's technique utilizes an iterative process to estimate each asset's risk. See column 8 line 60 to column 11 line 55, with a summary of Sandretto's technique described from column 8 line 60 to column 9 line 19.

As discussed in these portions of the Sandretto disclosure, Sandretto's process begins by estimating an initial set of financial statements and cash flows for each asset in a group, based on estimates for the values of operating, financing, accounting and economic variables. Thereafter, additional sets of cash flows are estimated using different estimates for the economic variable. Then, net present values are determined based on expected inflation and a risk measurement for each asset, returns are calculated for each asset, and simulated index returns are calculated for the assets as a group. The simulated returns for each asset are regressed against the simulated index returns in order to estimate an updated risk measure for each asset. Using these

updated risk measures, Sandretto's previous steps are repeated, with this process continuing until risk measures for the assets stabilize.

Thus, Sandretto only appears to use economic variable estimates for the purpose of calculating expected cash flows and financial statements. Sandretto does not appear to say anything about using previously predicted values to assign parameters to a forecasting model or using currently predicted values in connection with such a forecasting model to predict a value for a different target variable.

In the current Office Action, the Examiner asserts that Sandretto inherently discloses the feature of assigning values to parameters of a forecasting model to obtain a best fit of the values for plural predictor variables to historical values for a target variable. In response, Appellants initially note that this is not the feature that is recited in independent claims 1 and 23 above. Rather, those claims recite the feature of assigning values to parameters of a forecasting model to obtain a best fit of the previously predicted values for the plural predictor variables to the historical values for the target variable.

Appellants are unable to find any disclosure of this feature, either expressly or inherently, in Sandretto. The only portion of Sandretto cited by the Examiner as showing such a feature is column 4 line 60 to column 5 line 19. However, that portion of Sandretto merely discusses the Capital Asset Pricing Model (CAPM) which, according to Sandretto, simply involves: determining monthly returns for a particular asset (which are historical data), determining monthly returns for a stock index (which are historical data), and regressing the individual asset returns (which are historical data) against the market returns (which are historical data) in order to obtain a risk measure for the asset.

That risk measure can then be used to estimate the rate at which future cash flows from the asset will be discounted.

Such a disclosure clearly has nothing whatsoever to do with: (i) utilizing previously predicted values for predictor variables in conjunction with historical values for a target variable (which is different than the predictor variables) in order to create a forecasting model; and then (ii) using that forecasting model to predict a value for the target variable from currently predicted values for at least a subset of the predictor variables. To the contrary, as described in Sandretto and summarized above, CAPM only utilizes historical values in order to estimate the present value of an asset.

Accordingly, it is unclear how the above-referenced feature of the invention would have been inherent in Sandretto's disclosure. With regard to any allegation of inherency, the Federal Circuit has held as follows:

> To establish inherency, the extrinsic evidence [emphasis added] "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.* at 1269, 20 U.S.P.Q.2d at 1749 (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981)).

In re Robertson, (Fed. Cir. 1999) 169 F.3d 743, 745; 49 U.S.P.Q.2d 1949.

However, in the present case no extrinsic evidence has been cited to show that the recited limitation necessarily was present in Sandretto's disclosure. In fact, as noted above, nothing in Sandretto's own disclosure seems to indicate that this feature of the invention is present.

Certainly the portion of Sandretto cited by the Examiner clearly does not show this feature of the invention, and nothing else in Sandretto is seen to disclose or to

suggest it. Rather, the remainder of Sandretto is only understood to concern the iterative improvement to CAPM that is described above. In addition, none of the other applied art appears to remedy this deficiency.

In the "Response to Arguments" section of the most recent Office Action, the Examiner asserts that the "claimed recitations to 'previously predicted values', . . . as broadly recited, includes any past values already generated that is described in the Sandretto reference." The meaning of this assertion is unclear to Appellants. For example, it is unclear: (i) how "previously predicted values" possibly could read on any "past values already generated"; (ii) what specific values in Sandretto the Examiner is asserting were previously predicted; or (iii) how this assertion is intended to show that the present claims would have been obvious in view of the applied art.

The Examiner further asserts that Barber discloses the feature of "obtaining previously predicted values for use with currently predicted values for each of plural predictor variables that is also used by the forecasting model." [Emphasis added]. Once again, this asserted feature is different than what is actually recited in claims 1 and 23.

Those claims instead recite the features of: (i) assigning values to parameters of a forecasting model to obtain a best fit of previously predicted values for plural predictor variables to historical values for a target variable; and then (ii) generating a predicted value for the target variable from the currently predicted values for at least a subset of the plural predictor variables using the forecasting model and the values assigned to the parameters of the forecasting model. This is a two-step process that involves comparing predictions for a set of predictor variables to historical values for a different

(target) variable in order to assign forecasting model parameters; then, that model, together with those parameters, is used predict a value for the target variable based on the current predictions for the set of variables. The Examiner has not even alleged that the applied art shows these features of the invention.

In fact, Barber appears merely to involve estimating a current value for a target variable based on current values for a set of "predictors" (i.e., a "predictor vector") and also based on historical relationships between the target variable value and other known values for the predictor vector. See column 1, lines 20-25. One example given is the determination as to whether a particular point in a two-dimensional plane is more likely to be red or green given the colors of other points in the vector space. See column 1, lines 45-50. However, while Barber uses the term "predictor vector", it is clear from this example that he actually is comparing known or historical values for the predictor variables to known or historical values for the target variable in order to identify the relationship between the two. Then, based on that relationship and current values for the predictor variables, Barber estimates a current value for the target variable.

Barber does not appear to use predicted values either for the purpose of assigning parameters to a forecasting model or for predicting a value for his target variable. This conclusion is supported by the first portion of Barber's specification cited by the Examiner, i.e., column 1, lines 5-17, which only refers to historical values of the predictor variables. The second portion cited by the Examiner, i.e., column 3, lines 30-45, merely notes that it generally is not necessary to identify an optimal hyperplane.

Thus, Barber does not appear to disclose or suggest the above-referenced feature of the present claims, and the Examiner has cited no other reference as showing it.

Finally, Miller is not seen to make up for the foregoing deficiencies of Sandretto and Barber. In this regard, the portion of Miller cited by the Examiner, i.e., column 2, lines 35-43, only generally describes the desirability of being able to compare the predictive utility of various competing prediction algorithms, and says nothing at all about the particular prediction technique of the present invention. In this regard, the Examiner merely has asserted that Miller "teaches that predictive utility requires previously predicted values." While this assertion probably is a tautology, it is unclear how such an assertion would have motivated one of ordinary skill in the art to modify the actual teachings of Sandretto and Barber (described above) in any manner that would have resulted in the present invention.

Lacking the foregoing features of the present invention, no permissible combination of the applied art would have rendered obvious the above-referenced claims. Accordingly, independent claims 1 and 23, together with their dependent claims 3, 4, 6, 7, 10-12 and 14, are believed to be allowable over the applied art.

Group 2 Claim

Claim 2 depends from claim 1 (in Group 1) and recites the further limitation that the previously predicted values for the plural predictor variables include predictions of the predictor variables at the same time points as the historical values for the target variable. This additional feature of the invention is not disclosed or suggested by the applied art. In fact, the Examiner has not even alleged that the prior art shows this

feature. For this additional reason, claim 2 is believed to be allowable over the applied art.

Group 3 Claim

Claim 5 depends from claim 1 (in Group 1) and recites the further limitation that the assignment of values to the forecasting model parameters is performed by using a neural network technique and/or a genetic algorithm technique. This additional feature of the invention is not disclosed or suggested by the applied art.

In the most recent Office Action, the Examiner asserts that Barr discloses a neural network technique for "predicting a measure of a financial asset" and "teaches advantages of using such techniques in the art", citing column 2 lines 40-67. In response, Appellants acknowledge that the cited portion of Barr discusses certain uses of neural networks within financial analysis. However, it says nothing at all about using a neural network in any context where the input information includes predicted values. In addition, no other portion of Barr or of any of the other applied art is seen to provide such teaching, and the Examiner has not even alleged any such teaching. Similarly, the Examiner also has not alleged that the prior art shows the use of a genetic algorithm technique in the context of the present invention.

For these additional reasons, claim 5 is believed to be allowable over the applied art.

Group 4 Claim

Claim 8 depends from claim 1 (in Group 1) and recites the further limitation of finding a difference between the predicted value for the target variable and a second predicted value for the target variable, predicted using a different second technique, so

as to obtain an estimate of information that is specific to the target variable. This additional feature of the invention is not disclosed or suggested by the applied art. In fact, the Examiner has not even alleged that the prior art shows this feature. For this additional reason, claim 8 is believed to be allowable over the applied art.

Group 5 Claim

Claim 9 depends from claim 8 (in Group 4) and recites the further limitation that the second prediction technique is a combination forecast of the value of the target variable. This additional feature of the invention is not disclosed or suggested by the applied art.

In this regard, the Examiner has merely asserted, "It would have been obvious to one of ordinary skill in the art to utilize combination forecasts instead of the forecast model in Sandretto in view of Barber and Miller et al because both references *[sic]* teach forecast models as the substitution of one forecast model for another, in absence of expected *[sic]* or unobvious results." The meaning of this assertion is unclear to Appellants, as the Examiner has not even alleged that the prior art references teach claim 8's limitation of finding a difference between the predicted value for the target variable and a second predicted value for the target variable, predicted using a different second technique, so as to obtain an estimate of information that is specific to the target variable.

Moreover, Appellants are unable to find any teaching in Sandretto, Barber or Miller such as is asserted by the Examiner. Rather, it appears that each such reference promotes its own technique as being superior to the prior art. Moreover, even if any of the applied art references generally taught the ability to replace one forecasting model

with another (and none appears to), such a teaching still would not have suggested the use of a combination forecast in the context of the present invention.

For these additional reasons, claim 9 is believed to be allowable over the applied art.

Group 6 Claim

Claim 13 depends from claim 1 (in Group 1) and recites the further limitation that the previously predicted values for the predictor variables include predictions of each of the predictor variables at time points that are contemporaneous with the time points for the historical values for the target variable. This additional feature of the invention is not disclosed or suggested by the applied art. In fact, the Examiner has not even alleged that the prior art shows this feature. For this additional reason, claim 13 is believed to be allowable over the applied art.

Group 7 Claim

Claim 25 depends from claim 1 (in Group 1) and recites the further limitation that the previously predicted values and the currently predicted values for each of plural predictor variables are based on forecasts from a plurality of different individuals. This additional feature of the invention is not disclosed or suggested by the applied art. In fact, the Examiner has not even alleged that the prior art shows this feature. For this additional reason, claim 25 is believed to be allowable over the applied art.

Group 8 Claims

Independent claims 15 and 24 also address the problem of predicting a value of a target variable by using predictions of other variables to predict the value of the target

variable. This is accomplished by obtaining: (i) historical values for the target variable at each of plural time points, (ii) previously predicted values for each of plural predictor variables, and (iii) currently predicted values for each of the plural predictor variables, with the plural predictor variables being different from the target variable. A subset of the plural predictor variables whose previously predicted values provide a best fit to the historical values for the target variable are then identified by using stepwise linear regression. Using weighting coefficients from the stepwise linear regression, a predicted value for the target variable is generated from the currently predicted values for the identified subset of the plural predictor variables.

The foregoing combination of features is not disclosed or suggested by the applied art. In particular, no permissible combination of Sandretto, Barber and Miller discloses or suggests at least the features of: (i) identifying a subset of plural predictor variables whose previously predicted values provide a best fit to the historical values for a target variable by using stepwise linear regression; and then (ii) generating a predicted value for the target variable from currently predicted values for the identified subset of the plural predictive variables, using weighting coefficients obtained from the stepwise linear regression.

In this regard, Sandretto concerns a technique for determining the net present values and risks for a group of assets. Specifically, Sandretto's technique utilizes an iterative process to estimate each asset's risk. See column 8 line 60 to column 11 line 55, with a summary of Sandretto's technique described from column 8 line 60 to column 9 line 19.

As discussed in these portions of the Sandretto disclosure, Sandretto's process begins by estimating an initial set of financial statements and cash flows for each asset in a group, based on estimates for the values of operating, financing, accounting and economic variables. Thereafter, additional sets of cash flows are estimated using different estimates for the economic variable. Then, net present values are determined based on expected inflation and a risk measurement for each asset, returns are calculated for each asset, and simulated index returns are calculated for the assets as a group. The simulated returns for each asset are regressed against the simulated index returns in order to estimate an updated risk measure for each asset. Using these updated risk measures, Sandretto's previous steps are repeated, with this process continuing until risk measures for the assets stabilize.

Thus, Sandretto only appears to use economic variable estimates for the purpose of calculating expected cash flows and financial statements. Sandretto does not appear to say anything about: (i) using previously predicted values to identify a subset of predictor variables whose previously predicted values provide a best fit to the historical values for the target variable, by using stepwise linear regression; or (ii) using current predictions and weighting coefficients obtained from the stepwise linear regression to predict a value for a target variable.

In the current Office Action, the Examiner asserts that Sandretto inherently discloses the feature of assigning values to parameters of a forecasting model to obtain a best fit of the values for plural predictor variables to historical values for a target variable. In response, Appellants initially note that this is not the feature that is recited in independent claims 15 and 24 discussed above. Rather, those claims recite the

feature of identifying a subset of plural predictor variables whose previously predicted values provide a best fit to the historical values for a target variable by using stepwise linear regression. The Examiner has not even alleged that Sandretto shows this feature of the invention and Appellants are unable to find any disclosure of this feature, either expressly or inherently, in Sandretto.

In fact, the only portion of Sandretto cited by the Examiner in rejecting these claims is column 4 line 60 to column 5 line 19. However, that portion of Sandretto merely discusses the Capital Asset Pricing Model (CAPM) which, according to Sandretto, simply involves: determining monthly returns for a particular asset (which are historical data), determining monthly returns for a stock index (which are historical data), and regressing the individual asset returns (which are historical data) against the market returns (which are historical data) in order to obtain a risk measure for the asset. That risk measure can then be used to estimate the rate at which future cash flows from the asset will be discounted.

This disclosure, however, clearly has nothing whatsoever to do with: (i) identifying a subset of plural predictor variables whose previously predicted values provide a best fit to the historical values for a target variable by using stepwise linear regression; or (ii) generating a predicted value for the target variable from currently predicted values for the identified subset of the plural predictive variables, using weighting coefficients obtained from the stepwise linear regression.

Certainly the portion of Sandretto cited by the Examiner clearly does not show this feature of the invention, and nothing else in Sandretto is seen to disclose or to suggest it. Rather, the remainder of Sandretto is only understood to concern the

iterative improvement to CAPM that is described above. Similarly, none of the other applied art appears to remedy this deficiency.

In the "Response to Arguments" section of the most recent Office Action, the Examiner asserts that the "claimed recitations to 'previously predicted values', . . . as broadly recited, includes any past values already generated that is described in the Sandretto reference." The meaning of this assertion is unclear to Appellants. For example, it is unclear: (i) how "previously predicted values" possibly could read on any "past values already generated"; (ii) what specific values in Sandretto the Examiner is asserting were previously predicted; or (iii) how this assertion is intended to show that the present claims would have been obvious in view of the applied art.

The Examiner asserts that Barber discloses the feature of "obtaining previously predicted values for use with currently predicted values for each of plural predictor variables that is also used by the forecasting model." Once again, this asserted feature is different than what is actually recited in claims 15 and 24.

Those claims instead recite the features of: (i) identifying a subset of plural predictor variables whose previously predicted values provide a best fit to the historical values for a target variable by using stepwise linear regression; and then (ii) generating a predicted value for the target variable from currently predicted values for the identified subset of the plural predictive variables, using weighting coefficients obtained from the stepwise linear regression. This is a two-step process that involves comparing predictions for a set of predictor variables to historical values for a different (target) variable, using stepwise linear regression, in order to identify a best-fitting subset of the predictor variables; then, a value is predicted for the target variable from currently

predicted values for the identified subset of the plural predictive variables, using weighting coefficients obtained from the stepwise linear regression. Once again, the Examiner has not even alleged that the applied art shows this combination of features.

In fact, Barber appears merely to involve estimating a current value for a target variable based on current values for a set of "predictors" (i.e., a "predictor vector") and also based on historical relationships between the target variable value and other known values for the predictor vector. See column 1, lines 20-25. One example given is the determination as to whether a particular point in a two-dimensional plane is more likely to be red or green given the colors of other points in the vector space. See column 1, lines 45-50. However, while Barber uses the term "predictor vector", it is clear from this example that he actually is comparing known or historical values for the predictor variables to known or historical values for the target variable in order to identify the relationship between the two. Then, based on that relationship and current values for the predictor variables, Barber estimates a current value for the target variable.

Barber does not appear to use predicted values either for the purpose of identifying a subset of plural predictor variables or for predicting a value for his target variable. This conclusion is supported by the first portion of Barber's specification cited by the Examiner, i.e., column 1, lines 5-17, which only refers to historical values of the predictor variables. The second portion cited by the Examiner, i.e., column 3, lines 30-45, merely notes that it generally is not necessary to identify an optimal hyperplane.

Thus, Barber does not appear to disclose or suggest the above-referenced feature of the present claims, and the Examiner has cited no other reference as showing it.

Finally, Miller is not seen to make up for the foregoing deficiencies of Sandretto and Barber. In this regard, the portion of Miller cited by the Examiner, i.e., column 2, lines 35-43, only generally describes the desirability of being able to compare the predictive utility of various competing prediction algorithms, and says nothing at all about the particular prediction technique of the present invention. In this regard, the Examiner merely has asserted that Miller "teaches that predictive utility requires previously predicted values." While this assertion probably is a tautology, it is unclear how such an assertion would have motivated one of ordinary skill in the art to modify the actual teachings of Sandretto and Barber (described above) in any manner that would have resulted in the present invention.

Lacking the foregoing features of the present invention, no permissible combination of the applied art would have rendered obvious the above-referenced claims. Accordingly, independent claims 15 and 24, together with their dependent claims 17 and 20-22, are believed to be allowable over the applied art.

Group 9 Claim

Claim 16 depends from claim 15 (in Group 8) and recites the further limitation that the previously predicted values for the predictor variables include predictions of each of the predictor variables at time points that are contemporaneous with the time points for the historical values for the target variable. This additional feature of the invention is not disclosed or suggested by the applied art. In fact, the Examiner has not even alleged that the prior art shows this feature. For this additional reason, claim 16 is believed to be allowable over the applied art.

Group 10 Claim

Claim 18 depends from claim 15 (in Group 8) and recites the further limitation of finding a difference between the predicted value for the target variable and a second predicted value for the target variable, predicted using a different second technique, so as to obtain an estimate of information that is specific to the target variable. This additional feature of the invention is not disclosed or suggested by the applied art. In fact, the Examiner has not even alleged that the prior art shows this feature. For this additional reason, claim 18 is believed to be allowable over the applied art.

Group 11 Claim

Claim 19 depends from claim 18 (in Group 10) and recites the further limitation that the second prediction technique is a combination forecast of the value of the target variable. This additional feature of the invention is not disclosed or suggested by the applied art.

In this regard, the Examiner has merely asserted, "It would have been obvious to one of ordinary skill in the art to utilize combination forecasts instead of the forecast model in Sandretto in view of Barber and Miller et al because both references *[sic]* teach forecast models as the substitution of one forecast model for another, in absence of expected *[sic]* or unobvious results." The meaning of this assertion is unclear to Appellants, as the Examiner has not even alleged that the prior art references teach claim 8's limitation of finding a difference between the predicted value for the target variable and a second predicted value for the target variable, predicted using a different second technique, so as to obtain an estimate of information that is specific to the target variable.

Moreover, Appellants are unable to find any teaching in Sandretto, Barber or Miller such as is asserted by the Examiner. Rather, it appears that each such reference promotes its own technique as being superior to the prior art. Moreover, even if any of the applied art references generally taught the ability to replace one forecasting model with another (and none appears to), such a teaching still would not have suggested the use of a combination forecast in the context of the present invention.

For these additional reasons, claim 19 is believed to be allowable over the applied art.

Group 12 Claim

Claim 26 depends from claim 18 (in Group 8) and recites the further limitation that the previously predicted values and the currently predicted values for each of plural predictor variables are based on forecasts from a plurality of different individuals. This additional feature of the invention is not disclosed or suggested by the applied art. In fact, the Examiner has not even alleged that the prior art shows this feature. For this additional reason, claim 26 is believed to be allowable over the applied art.

IX. CONCLUDING REMARKS

As Appellants have shown above, for a number of reasons, nothing in the cited references discloses, teaches, or suggests the invention recited by the claims on appeal. Appellants therefore respectfully submit that the claimed invention is patentably distinct over the applied art.

In view of the foregoing remarks, Appellants respectfully request that the rejection of claims 1 to 26 be reversed and a Notice of Allowance issued.

Respectfully submitted,

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Dated: August 28, 2003

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APPENDIX A

Claims on Appeal

1. A method for predicting a value of a target variable based on predictions of other variables, said method comprising:

obtaining historical values for the target variable at each of plural time points;

obtaining previously predicted values and currently predicted values for each of plural predictor variables, the plural predictor variables being different from the target variable;

assigning values to parameters of a forecasting model to obtain a best fit of the previously predicted values for the plural predictor variables to the historical values for the target variable; and

utilizing a computing device to generate a predicted value for the target variable from the currently predicted values for at least a subset of the plural predictor variables using the forecasting model and the values assigned to the parameters of the forecasting model.

2. A method according to Claim 1, wherein the previously predicted values for the plural predictor variables comprise predictions of each of the predictor variables at each of the plural time points.

3. A method according to Claim 1, wherein said assigning step is performed by using a statistical curve fitting technique.

4. A method according to Claim 3, wherein the statistical curve fitting technique comprises at least one of a stepwise linear regression technique and a nonlinear regression technique.

5. A method according to Claim 1, wherein said assigning step is performed by using at least one of a neural network technique and a genetic algorithm technique.

6. A method according to Claim 1, wherein the parameters of the forecasting model comprise weighting coefficients.

7. A method according to Claim 1, wherein the target variable is a measure of a value of a financial asset.

8. A method according to Claim 1, further comprising a step of finding a difference between the predicted value for the target variable and a second predicted value for the target variable which is predicted using a second technique that is different than said predicting step, so as to obtain an estimate of information that is specific to the target variable.

9. A method according to Claim 8, wherein the second technique is a combination forecast of the value of the target variable.

10. A method according to Claim 8, further comprising a step of using the estimate of information that is specific to the target variable to predict an effect of a same type of information on a second variable that is different than the target variable.

11. A method according to Claim 1, further comprising a step of finding a difference between the predicted value of the target variable and an actual value realized for the target variable.

12. A method according to Claim 11, further comprising a step of using the difference between the predicted value of the target variable and the actual value realized for the target variable to predict an effect of a same type of information on a second variable that is different than the target variable.

13. A method according to Claim 1, wherein the previously predicted values for the plural predictor variables comprise predictions of each of the predictor variables at time points that are contemporaneous with the plural time points.

14. A method according to Claim 1, wherein the target variable is a measure of a value of an asset.

15. A method for predicting a value of a target variable based on predictions of other variables, said method comprising:

obtaining historical values for the target variable at each of plural time points;

obtaining previously predicted values and currently predicted values for each of plural predictor variables, the plural predictor variables being different from the target variable;

identifying a subset of the plural predictor variables whose previously predicted values provide a best fit to the historical values for the target variable, by using stepwise linear regression; and

utilizing a computing device to generate a predicted value for the target variable from the currently predicted values for the subset of the plural predictor variables identified in said identifying step using weighting coefficients obtained from the stepwise linear regression.

16. A method according to Claim 15, wherein the previously predicted values for the plural predictor variables comprise predictions of each of the predictor variables at time points that are contemporaneous with the plural time points.

17. A method according to Claim 15, wherein the target variable is a measure of a value of an asset.

18. A method according to Claim 15, further comprising a step of finding a difference between the predicted value for the target variable and a second predicted value for the target variable that has been predicted using a second technique that is different than said predicting step, so as to obtain an estimate of information that is specific to the target variable.

19. A method according to Claim 18, wherein the second technique is a combination forecast of the value of the target variable.

20. A method according to Claim 18, further comprising a step of using the estimate of information that is specific to the target variable to predict an effect of a same type of information on a second variable that is different than the target variable.

21. A method according to Claim 15, further comprising a step of finding a difference between the predicted value for the target variable and an actual value realized for the target variable.

22. A method according to Claim 21, further comprising a step of using the difference between the predicted value for the target variable and the actual value realized for the target variable to predict an effect of a same type information on a second variable that is different than the target variable.

23. A computer-readable medium encoded with computer-executable process steps for predicting a value of a target variable based on predictions of other variables, wherein said computer-executable process steps include steps to:

obtain historical values for the target variable at each of plural time points;

obtain previously predicted values and currently predicted values for each of plural predictor variables, the plural predictor variables being different from the target variable;

assign values to parameters of a forecasting model to obtain a best fit of the previously predicted values for the plural predictor variables to the historical values for the target variable; and

generate a predicted value for the target variable from the currently predicted values for at least a subset of the plural predictor variables using the forecasting model and the values assigned to the parameters of the forecasting model.

24. An apparatus for predicting a value of a target variable based on predictions of other variables, said apparatus comprising:

a processor for executing stored program instruction steps; and

a memory connected to the processor for storing the program instruction steps,

wherein the program instruction steps include steps to:

(a) obtain historical values for the target variable at each of plural time points;

(b) obtain previously predicted values and currently predicted values for each of plural predictor variables, the plural predictor variables being different from the target variable;

(c) assign values to parameters of a forecasting model to obtain a best fit of the previously predicted values for the plural predictor variables to the historical values for the target variable; and

(d) generate a predicted value for the target variable from the currently predicted values for at least a subset of the plural predictor variables using the forecasting model and the values assigned to the parameters of the forecasting model.

25. A method according to claim 1, wherein the previously predicted values and the currently predicted values for each of plural predictor variables are based on forecasts from a plurality of different individuals.

26. A method according to claim 15, wherein the previously predicted values and the currently predicted values for each of plural predictor variables are based on forecasts from a plurality of different individuals.